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ABSTRACT

The acquisition of reading fluency crucially involves the beginning reader's tacit recognition that he or she must learn to compensate for the absence of graphic signals corresponding to certain prosodic cues by making better use of the morphological and syntactic cues that are preserved. The success of the method of repeated readings and similar reading instruction techniques results from the fact that these methods facilitate discovery of the appropriate syntactic phrasing in the written signal. The crucial step comes with the beginning reader's recognition that parsing strategies other than those that rely on prosody or its somewhat haphazard graphic analogues are required in order to read with sense. (Author/FL)

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ON THE ACQUISITION OF READING FLUENCY

by

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Report on the Project on
Studies in Language: Reading and Communication

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Abstract

The acquisition of reading fluency crucially involves the beginning reader's tacit recognition that he must learn to compensate for the absence of graphic signals corresponding to certain prosodic cues by making better use of the morphological and syntactic cues that are preserved. I argue that the success of the method of repeated readings and similar reading instruction techniques results from the fact that these methods facilitate discovery of the appropriate syntactic phrasing in the written signal. I suggest that the crucial step comes with the beginning reader's recognition that parsing strategies other than those which rely on prosody or its somewhat haphazard graphic analogues are required in order to read with sense.

Despite the extensive literature on reading, fundamental questions remain about the processes involved in the acquisition of fluent reading ability, that level of reading competence at which nontechnical textual materials can be effortlessly, smoothly, and automatically understood. It is clear that, in order to reach this stage of reading ability, a person must go beyond simply decoding words: He must learn to group words together into meaningful sequences. The theoretically and pedagogically important questions concerning how this movement from mere decoding to complete fluency takes place are less well understood, however. On a practical level, the questions are important precisely because many beginning readers have greater or lesser difficulty making the transition; hence, identifying the factors that facilitate or hinder progress to reading fluency is socially as well as intellectually significant.

Different types of explanations have been proposed to account for the acquisition and nonacquisition of fluency, and various suggestions have been made about the causal factors that hinder or, in some cases, block acquisition. One of the most important suggestions is due to Fries (1963), who notes the significance of the lack of graphic signs corresponding to prosodic (suprasegmental) features; his comments on the subject are worth quoting <u>in extenso</u>:

> In the graphic representations of language there are left out such language signals as intonation and stress and pause. These are important features of the signals of meanings. . . If one is to read with comprehension the graphic representations

> of the language signals, he must learn to supply those portions of the signals which are not in the graphic representations themselves. He must supply the significant stresses, pauses, and intonation sequences. A large part of learning to read is a process of learning to supply rapidly and automatically the portions of the oral signals that are not represented in the graphic signs. It is not simply a matter of speed and fluency. It shows itself in oral reading in what has been called reading "with expression." This oral reading "with expression" consists, not only of avoiding a "monotone" in pronunciation . . . but also of supplying the tone sequences, the stresses, and the pauses that in talk mark the word groupings that signal the total range of meanings. (p. 130)

Though some elaborations on Fries's observations are possible, even necessary, his statement remains a cogent description of a crucial part of fluency acquisition, and constitutes an important part of the scholarly foundation for the views expressed in this paper.

In the discussion that follows, I will contend that the acquisition of fluent reading competence crucially involves the beginning reader's tacit recognition that he must learn to compensate for the absence of prosodic cues in the written signal by making use (or better use) of the cues that are preserved. I will develop this position by focusing on certain recent research on the methodology of reading instruction. I will examine the theoretical rationale that has been given for the results of this research, and I will offer an alternative (or at least complementary) theoretical explanation for the results.

The Method of Repeated Readings

Samuels (1979) presents theoretical and empirical evidence in support of a technique intended as "a supplement in a developmental reading program," a technique which is claimed (p. 403) to be valuable not only for remedial purposes, but also for "building reading fluency." The method requires children to reread "a short, meaningful passage several times until a satisfactory level of fluency is reached. Then the procedure is repeated with a new passage." Samuels provides empirical evidence showing that the method results in increased reading speeds and in a reduction of word recognition errors, not only for the given passage but also for new passages. Thus, the evidence supports the claim that the method improves both accuracy and speed, which is to say that it increases reading fluency. Moreover, Samuels suggests that there is good reason to believe that a concomitant increase in comprehension occurs along with the increase in fluency.

Samuels's evidence for his technique is strong, and the method itself seems an altogether plausible and natural one. As he himself notes, "Some teachers are familiar with this technique and have used it," by which he presumably means that the technique has at various times been developed on a heuristic, ad hoc, and pretheoretical basis by some teachers, but that it has not been used widely and systematically. Furthermore, as Samuels again himself notes, the method resembles in certain important respects a technique proposed by Carol Chomsky (1978), and can also be viewed as an amplified analogue of the neurological impress techniques proposed by Heckelman (1969), Hollingsworth (1970),

and Hoskisson (1975a, 1975b). Another interesting point about the method, however, aside from the fact that it apparently works, is that one might predict its success on the basis of theoretical considerations somewhat different from those Samuels presents. (In what follows, I shall restrict my attention to Samuels' proposals, but the remarks are intended to generalize to other proposals similar to Samuels' including specifically Carol Chomsky's.)

The theoretical rationale which Samuels provides for the method is based on the theory of automatic information processing in reading (LaBerge & Samuels, 1974). This theory claims that "a fluent reader decodes text automatically--that is, without attention--thus leaving attention free to be used for comprehension." Since beginning readers must focus on the decoding problem, they are by definition not reading automatically. The consequence is that comprehension is more difficult and takes longer. Samuels breaks the process of acquiring reading fluency down into three stages, only the last two of which are significant in considering the attainment of actual fluency. The second of the levels is what Samuels describes as the accuracy stage, at which the reader can accurately recognize printed words but must devote attention to the decoding process. Behavioral correlates of this stage can be identified in the oral reading of children at this level; it is "slow and halting, without expression," and it is characterized by poor comprehension "despite high word recognition accuracy." Beyond this stage comes the level of automaticity, whose behavioral correlates are that the individual's oral reading rate "approximates or may even be faster than [his] speaking rate, [and] the reading is with expression. . ."

Moreover, with familiar material, students at this level "should be able to comprehend while reading aloud."

Samuels's theoretical position as described thus far and his analysis of the stages in acquiring reading fluency are actually quite general and are compatible with a wide range of more specific theoretical views on the acquisition of reading fluency. Therefore, one might ask what explanation Samuels's framework offers for the movement from stage two to stage three. Since it is for the fostering of precisely this step that the method of repeated readings is designed, the question can be broken down into two more specific components: Why does this method facilitate movement from the accuracy stage to the automaticity stage and what features of Samuels's theory would predict that the method of repeated readings will lead to fluency? It is in the answers to these questions that a weakness appears in the explanatory force of Samuels's theory. Essentially, his argument goes, the acquisition of reading fluency is like the acquisition of certain other kinds of complex skills requiring high levels of performance, skills such as athletics and musicianship. By analogy with these skills, Samuels suggests (p. 407) that what the method of "repeated readings does is to give the student the opportunity to master the material before moving on." Like the athlete and the musician, the reader is "given a small unit of activity and this unit is practised over and over until it is mastered." But if we examine this analogy carefully, we can see that in part at least it begs precisely the question it is intended to answer. Why should the mere repetition of the same passages produce the kinds of impressive gains in reading speed and accuracy that are found <u>across new reading</u>

samples? It will not do to say simply that there has been a generalization of habits from one set of stimuli to another, since the question remains why and how such a generalization can take place. More specifically, the following question is raised: What particular skills do readers acquire in performing repeated readings of the kind Samuels is suggesting? The theory Samuels presents provides no answer to this question.

An Alternative Rationale for the Method

A possible answer, or at least a part of one, may be found in research that we have been conducting at the Wisconsin Research and Development Center. Based on experimental work which is being reported elsewhere (Read, Schreiber, & Walia, 1979; Schreiber & Read, in press), we have suggested that, for children of early school age, prosodic features (intonation, stress, and especially duration) are particularly important signals of the syntactic structure of spoken utterances. For instance, in an experiment where children perform a type of parsing procedure on sentences like (a) below, we have observed that their ability to segment into subject noun phrase (our dog's bark) and predicate phrase (sometimes frightens people) depends crucially on the prosodic features of the sentence, particularly the phrase-final lengthening of the syllabic peak in bark, a lengthening that typically occurs in natural pronunciations of a sentence like this.[1]

(a) Our dog's bark sometimes frightens people.

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[1] Martin (1970) and Klatt (1975, 1976) discuss the significance of duration and "phrase-final lengthening."

In fact, we have reason to believe that children rely more heavily than adults do on these phonetic properties as cues for the tacit analysis of structure. This is not the place to review the analysis and arguments, but if our conclusions are valid, they would predict a particular type of difficulty in the acquisition of reading fluency; because punctuation does not divide written sentences into phrases as clearly and systematically as prosody does for spoken sentences, we would predict that many beginning readers (at Samuels's level two) would not know how to put together into meaningfully related phrases words which they can decode and which they could of course comprehend in the form of a sentence spoken or read aloud to them. As one particular example of this, consider sentence (a) again. Based on evidence from our experiments, we infer that children use the phrase-final syllable-lengthening on bark which prosodically separates the multiword subject noun phrase from the predicate phrase as a very important signal of the subject-predicate boundary. But note that in edited written English there is an actual proscription against separating subject and predicate with a comma.

Suppose that our contention is correct that children depend on prosodic cues as crucially important signals of syntactic structure. It is easy to demonstrate that written English does a rather poor job of representing these prosodic features.[2] For example, while the

[2]The features left unrepresented are sentence-internal ones, not those which signal the end of a sentence. Note, incidentally, the interesting similarity here to the problem of "phoneme-grapheme correspondences." Venezky (1970) has shown that English orthography is much more consistent than is often claimed, and Chomsky and Halle (1968) have argued that English orthography is almost an optimal system.

immediately preceding sentence is admittedly not of a type likely to be encountered in early reading materials, it is not at all uncharacteristic in its complete absence of any punctuation, other than the sentence-final period; but a fairly normal, nonemphatic pronunciation of the sentence would involve breaking it up into at least four phonological phrases, each with its own characteristic prosodic contour. The four phrases are the ones that terminate with the words "demonstrate," "English," "job," and "features." I shall not describe the specific prosodic features that characterize these various phrases, though as suggested earlier one cue that would in normal pronunciations demarcate each of them as terminating a syntactic phrase is a lengthening of the last syllabic segment. The significant point for our purposes is that prosodic features mark the boundaries between syntactic phrases in a large number of cases.[3] But if children tacitly use such cues in perceptually parsing spoken sentences, it would follow that they would have difficulty in moving from stage two to stage three, given the absence of consistent signals in the written version that correspond

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The Chomsky and Halle position may be valid for the competent adult reader, but it certainly is not valid, nor do they claim that it is, for the initial reader. Similarly, the lack of graphic features to represent many of the sentence-internal prosodic signals of structure may be of little importance for fluent readers, and may even have a facilitating effect for them, but for the student who has not yet acquired fluency the absence may be a considerable handicap.

[3]This is not to say that prosodic features mark syntactic boundaries in all cases, nor that all major syntactic boundaries are thus marked; the fit between syntax and phonology is not perfect. For example, sentences containing a single word subject, especially a pronoun, typically lack a prosodic break between subject and predicate. It is precisely on such sentences that children have difficulties performing certain kinds of tasks that depend on the ability to segment sentences into subject and predicate. This issue is discussed at some length in Read et al., 1979.

to the prosodic cues. That is, a major sign to the child of which words go together to form a syntactic (and semantically coherent) phrase is the prosodic contour which binds together a series of words; indeed, it is far from obvious that the child's perceptual parsing strategies operate in terms of units smaller than phrases. But whatever the details of the perceptual process may be, there is clearly something of a mismatch between what is represented in the acoustic signal and what the graphic representation provides or, rather, fails to provide.

This mismatch is not on the segmental level, because whatever the deficiencies of the orthographic system may be, its principles of organization are at least analogous to those of the system of segmental phonemes. In learning a language, a child acquires knowledge of the segmentation of morphemes into a set of minimal integral units, the phonemes of the language. The acquisition of stage two reading ability involves the transfer of this knowledge from one modality to another, from the aural to the visual. Many, though not all, children are able to make this transfer easily. But the transfer of the strategies by which a child segments a sentence into its constituent syntactic phrases presents a different problem. Here we have to do with transfer from a system in which prosodic marking plays a major role in identifying syntactic phrases to a system in which the phrases go largely unmarked graphically. The child must learn to compensate somehow for the lack of overt graphic marking of many syntactic units. Whereas the absence of prosodic breaks between morphemes and words commonly signals syntactic constituency in the aural-perceptual system, the absence of graphic marks

in the written code can be taken as evidence of nothing except that the sentence has not ended.[4]

In view of the preceding observations, we can begin to understand the acquisition of stage two and stage three reading better. Most beginning readers can be taught fairly easily that there is a set of letter-sound correspondences which are, if not perfect, at least reasonably consistent and rational; but the situation is quite different with respect to syntactic phrasing. Not only is there no consistent correspondence between features of the acoustic signal and the graphic, there is not even any explicit recognition or awareness of the deficiency on the part of most teachers. It is true that teachers often attempt to convey some rather inchoate advice about the problem to the stage two reader when they suggest reading "with expression." This suggestion undoubtedly reflects an implicit awareness that what is lacking in the child's reading is any sense of phrasing, any prosodic indication of the syntactic organization of the material. Unfortunately, the child has absolutely no a priori conception of what the phrase "with expression" means. Nor do teachers typically provide much help, because they themselves generally do not have explicit understanding of what they mean by the phrase.

In large part, it is the ability to compensate for the absence of prosodic cues that enables a reader to achieve reading fluency. The explanation for the success of the method of repeated readings therefore

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[4] In the writing system, there is of course one graphic device which provides information much more consistently than prosodic features do in the acoustic signal, namely the space between words. But this graphic device provides significant evidence about phrasing only occasionally.

probably lies not so much in the notion of exercising some skill, nor in the reinforcement of behaviors that are not present to begin with; rather, it arises from the observation that what one must do in order to attain fluency in reading is to compensate for the absence of prosodic marking in identifying syntactic phrases. For example, a sentence like (b) below contains multiple markings that help identify the location of the subject-predicate boundary:

(b) Those tall boys are playing basketball.

Prosodic features in the spoken form of the sentence provide a set of primary cues of great importance for children, but other cues abound. The form of the demonstrative those suggests that the head of the subject noun phrase will be plural, and hence that the first plural noun encountered in the string is likely to be the terminal element of the subject noun phrase. The form boys fulfills this grammatical expectation, and the occurrence of the immediately following plural verb form are and the participle playing effectively guarantees that the subject-predicate boundary must be located between boys and are. Other kinds of morphological, syntactic, and semantic information converge in support of this analysis, so that the basic grammatical structure of the sentence can be determined independently of prosodic features. Thus, what most likely happens to produce the effect that Samuels reports can be reconstructed roughly as follows. Let us start from the premise that the stage two reader understands (at least partially) that the purpose of reading is to extract the message that the written form communicates. As a result of reading and rereading a given passage, the stage two reader begins to recognize what kind of

syntactic phrasing is necessary in order to make sense of the passage; this recognition comes about as the reader discovers and makes use of the syntactic, semantic, morphological, and contextual features which are found in the written form and which correspond to features that he can and does use to a greater or lesser extent in aural processing. But once this step takes place in the repeated readings of a given passage, the way toward fluent reading becomes less and less mysterious as it becomes more and more obvious that, in order to discover the appropriate syntactic phrasing in the written signal, the reader must rely on cues other than the prosodic ones that play so large a role in the perception of phrasing in the oral signal. As the child learns (tacitly, of course) that the prosodic cues are not systematically preserved in writing, he begins to make better use of the other kinds of signals that are preserved such as function words, inflectional endings and other morphological signals, and the form-class membership of lexical items, as well as the various perceptual strategies that may be based on the use of these formal signaling devices. We are not yet in a position to disentangle and distinguish the relative importance of these several formal features; therefore, the questions raised by Fleisher, Jenkins, and Pany (1979, p. 47) remain unanswered:

> It is not known . . . what aspects of repeated reading practice are responsible for comprehension improvement. The procedure has the potential to affect comprehension by facilitating "chunking" of information, or by familiarizing readers with vocabulary and syntactical structures, as well as reducing the attentional burden of slow decoding. Any

one of these possible effects might account for reported improvements in comprehension.

But while we cannot answer whether any or all of these effects may contribute, we do believe that the crucial first step between stage two and three comes with the tacit discovery that parsing strategies other than those which rely on prosody or its somewhat haphazard graphic analogues are required in order to read with sense.

This explanation of Samuels's empirical results would be incomplete, however, if it did not include one further observation. Based on the research we have conducted, the prediction follows that oral readings of the passages by the teacher or some other competent reader would facilitate the success of the method of repeated readings. We would predict that if the child hears a fluent reader produce the appropriate phrasing of the sentences in the passage, he will have less difficulty imposing such phrasing himself and will recognize more easily the character of the task. In fact, Samuels himself reports (p. 405) that some of the students using the method have had "audio support"; in these cases, "the student reads the passage silently while listening to the tape recorded narration over earphones." However, Samuels does not report on any differences between this situation and the one where there is no audio support. On the other hand, the method Carol Chomsky (1978) reports relies crucially on children hearing the oral reading of competent adults; the striking success of her method is thus entirely consistent with the prediction of our theory. To the extent that the available evidence supports this prediction, it also supports the validity of the theoretical rationale I have offered for the success

of Samuels's method.

Some Related Studies

It is appropriate to point out briefly here the relation between the observations presented in this paper and the work and ideas of others. As indicated at the outset, Fries (1963) suggested that the absence of a systematic correspondence between graphic and prosodic cues may constitute a significant hurdle in the acquisition of reading skills. Other scholars after Fries, such as Gleason (1965), have made the same point, at least programmatically. A more specific attempt to relate prosodic features to aspects of reading acquisition can be found in Stice (1978); she observes (p. 137) that "intonation is a signal system operating in oral language that is not wholly coded in the medium of print."[5] She also comments that perhaps "reading instruction can be improved through an understanding of the possible effects that the absence of printed equivalents for certain oral cues to intended meaning has on reading comprehension of developing readers." As we have done, moreover, she notes the lack of print cues corresponding to the juncture that is often found between subject and predicate in the oral medium. Stice's paper reports the results of a study which investigates whether a positive correlation exists between comprehension of prosodic features and reading comprehension. Specifically, her study examines "the degree of linear association between comprehension of [contrastive] stress as one element of intonation and

[5] Stice (1978) uses the word "intonation" to refer broadly to "juncture, stress, and pitch." The term is thus essentially equivalent to "prosody" as it has been used in this paper.

comprehension of silent reading." Were it not for what appears to be a fundamental methodological flaw in the design of the experiment, Stice's results could be viewed as very encouraging. She finds a strong correlation between reading comprehension and comprehension of oral contrastive stress. This conclusion is in a general way quite consistent with the claims we have made about the role of prosody. But unfortunately, the task Stice's subjects performed does not permit the interpretation of the results that Stice provides, because the experimental task does not provide an independent measure of oral comprehension. The results are confounded by the fact that the measure of oral comprehension was based crucially on a reading task. Subjects were given a written copy of the test sentences to read along with the oral version that they heard. They were supposed "to listen, [to] read along on a printed copy of the questions and sentences, and to select [one of three alternative renditions] of the sentence to answer the question." Stice claims that the use of written copy did not contaminate the measurements, since the variable being tested, contrastive stress, was not represented in the written versions. But she overlooks the fact that requiring the subjects to read the sentences at all immediately confounds the result since it is to be expected that better readers will perform better on a test that requires reading as a component task. In other words, the high correlation Stice obtains can be almost fully explained as an artifact, a consequence of reading ability itself.

A methodologically unimpeachable study on the use of speech rhythms in reading instruction is reported in Martin and Meltzer (1976). [the theoretical basis of this work is described in Martin (1972). A related

paper of interest is Martin, Meltzer, & Mills, 1978]. Martin and Meltzer point out (1976, p. 154) that an important difference between the processing of oral and written language arises from the fact that "spoken language is dynamic and its constituents are deployed sequentially, whereas written language is static and its constituents are deployed simultaneously." They go on to observe that "it is possible that learning the connection [between the sequence of symbols seen and the auditory sequence of sounds heard when they are read aloud] is not always immediate or an all-or-none matter . . . ." Most interestingly, they note that in oral language, "the temporal patterning provides important information about how the individual elements become part of the organization of the whole sentence" and they go on to suggest that "it is possible that incorporating rhythmic information into a visual presentation will facilitate the development of organizational skills for reading ordinary printed text." The experiment reported in the paper then tends to substantiate the view that incorporating rhythmic information in a graphic presentation does indeed improve reading fluency, at least temporarily.[6]

The views of Martin and Meltzer are clearly rather close to those presented in this paper. The main differences are matters of degree and emphasis. Their specific focus is on temporal patterning, a crucial component of prosody. The basis of our suggestions has been somewhat more general, in that we have not treated temporal features as the exclusive locus of prosodic importance. At the same time, we do

[6]Martin and Meltzer (1976, p. 159) state that they do not know whether the gains in reading fluency that were found in their study will prove to be only temporary or not.

tentatively accept the primacy of temporal factors, specifically the durational effects evident in phrase-final lengthening, our understanding of the importance of which is due in some measure to Martin (1970) himself. The other point of relevance here is simply that Martin and Meltzer rather gloss over the functional significance of the prosodic features; we have argued that prosody often signals syntactic phrasing, and that the efficacy of the method of repeated readings and similar techniques arises from the way in which the absence of prosodic cues is compensated for, so that beginning readers can begin to use other markers of syntactic structure more successfully in reading. Whether Martin and Meltzer would agree with such an interpretation is unclear.

And as one final, practical observation, I note that the technique Martin and Meltzer propose, while theoretically attractive, does require a degree of technology (and also cost) which is quite unnecessary with the method of repeated readings or similar proposals. How the two approaches compare in terms of improving fluency is thus an important empirical and practical question.

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